

**U.S. Department of Energy
Renewable Energy Business Workshop and Study Tour
September 17-23, 2001
China**



In September 2001, the U.S. National Renewable Energy Laboratory (NREL) and the Chinese Center for Renewable Energy Development (CRED) held a China Business Workshop and Study Tour. The workshop, sponsored by the U.S. Department of Energy, was held in Chengdu (Sichuan province), and the study tour included Kunming (Yunnan Province), and Hohhot (Inner Mongolia Autonomous Region).

THE WORKSHOP: CHENGDU

More than 100 representatives from renewable energy-related companies and research institutes from China attended the workshop, while four companies from the U.S. were represented. Originally, about ten U.S. companies planned to attend the workshop and study tour, but were prevented from participating due to the events of September 11, 2001.

Presiding over the workshop were: Mr. David Bleyle, Consul General in Chengdu; Mr. Xianfa Liu, Deputy Director General of the Department of Resource Conservation and Comprehensive Utilization, State Economic and Trade Commission (SETC); Mr. Dehou Li, Deputy Director of Economic and Trade Commission of Sichuan Province; Mr. Junsheng Zhu, Chairman of the Chinese Renewable Energy Industries Association; Mr. Junfeng Li, Deputy Director of Energy Research Institute, State Development and Planning Commission; and Mr. Guanfa Han, General Manager of Huaguan Solar PV company.

In his opening remarks, Mr. Xianfa Liu remarked that since the beginning of the Energy Efficiency and Renewable Energy Cooperation Protocol between China and the U.S., many projects had been carried out and many enterprises and institutes had benefited from these bilateral activities. Mr. Liu also provided a summary of the renewable energy development plan that was later issued by the SETC in November 2001.

Mr. David Bleyle, Consul General in Chengdu, then offered a speech. He stated that "trade missions such as this are an excellent method of increasing understanding and finding mutually beneficial opportunities for private sector organizations in our two countries to work together. Renewable energy is a topic of particular interest to Environment, Science and Technology at our Embassy in Beijing. Energy technologies are one of the most active areas of the bilateral cooperation. Climate change is a serious concern for all countries of the world and renewable energy is a necessary element in reducing carbon dioxide emissions in a sustainable manner."

Mr. Dehou Li, Deputy Director of the Sichuan Economic and Trade Commission, welcomed the conference participants to Sichuan province, a beautiful area rich in many kinds of natural resources, including renewable energy resources. He expressed enthusiasm for the investment in renewable energy and other businesses.

Dr. Debra Lew, Project Manager from NREL, summarized the activities under Annex 4, which fall into the following categories (all activities summarized were current as of the time of the workshop):

1. Rural Energy Development

- Nearly 800 photovoltaic (PV) solar home systems and 10 school systems had been installed in Gansu;
- 340 household PV/wind systems had been installed in Inner Mongolia, 200 solar home systems installed in Tibet, and a 2 kW PV village power system with Internet communications was under development.

2. Wind Energy Development

- Wind Mapping for southeast China;
- Xiao Qing Dao wind/diesel hybrid system installed.

3. Renewable Energy Business Development

- Business Development Workshops and study tours previously held in Xian, Beijing, Inner Mongolia, Xinjiang, and Gansu;
- U.S./China Renewable Energy Forum held in DC in April 2000, and U.S./China Clean Energy Technology Forum held in Beijing in August 2001.

4. Geothermal Energy Production and Use

- Development of 8 GHP projects, 3 of which, totaling \$5.3M, had been completed.

5. Policy and Planning

- Establishment of a Training Certification program for China's Brightness Program;
- Assistance on policy issues, specifically for mandated market share mechanisms and national financial incentives for grid-connected renewables, as well as assistance in analyzing provinces' renewable energy potential and setting targets and policies.

Ms. Xiaorong Cao, of the Commercial section of the American Consulate in Chengdu, offered a speech on how to do business in China, as well as the functions of and assistance available from the Consulate.

In the second half of the morning session, Mr. Wenqiang Liu, Ms. Jean Ku, Ms. Hong Miao, Mr. Yanqin Song, Mr. Frederic Asseline, and Mr. Shenghong Ma introduced SETC's renewable energy development plan, the U.S. DOE/NREL-supported Chinese renewable energy development project, the GEF/World Bank China renewable energy development project, the Chinese Renewable Energy Industries Association, and the Brightness Program of SDPC, respectively. (For more information on these programs, see the fact sheets available on NREL's China Web site at <http://www.nrel.gov/international/china>.)

Mr. Wenqiang Liu, Project Officer from SETC, provided a summary of the Renewable Energy Development Plan. During the Tenth Five-Year Plan, SETC will focus mainly on four types of renewable energy technologies-wind, solar water heater, solar PV, and large medium-scale biogas projects-and set objectives for each technology. The guiding principals for achieving the objectives are "a market-oriented approach that considers enterprise as core business, and reliance on technology improvement and on the product to launch the market." These principals can also be described as "localizing the technology, standardizing the product, scaling up the enterprises, and disciplining the market."

The companies in the DOE delegation were offered the floor first, to introduce their businesses and their interests in cooperating with Chinese counterparts. They were Mr. Charles Jing, president of DAWSON, whose product is amorphous silicon cell and whose interest was to invest in a module plant in China; Ms. Lea Walker, President of Alltech, who was interested in the import and export business between China and the U.S.; Mr. Simon Aw, business promoter from Schott in Singapore, whose interest lay in finding an agent to enter the Chinese market and bringing Chinese products abroad in a collaborative manner.

Altogether, about 20 representatives from all areas of China offered speeches and introduced their businesses and their interests in carrying out specific international collaborations. These companies included Shanghai Jiao Tong University, Guofly Green Energy Co. Ltd., Yunnan Semi-Conductor Devise Factory, Inner Mongolia Huade Company, and Beijing Jike Energy New Technology Co. Ltd. After the panel meeting, individual business meetings were arranged for each of the U.S. companies.

Besides organizing the formal activities of the workshop, CRED arranged several meetings for representatives from Energy Photovoltaics, Inc. (EPV) to meet people from the GEF/World Bank China Renewable Energy Development Project Management Office, Jike Energy New Technology Co. Ltd., and Xizang Huaguan PV Tech Co. Ltd. One result of these meetings was a memorandum for cooperation, signed by EPV and Huaguan.

After the workshop, the DOE delegation took a study tour to Kunming and Hohhot, accompanied by CRED staff.

STUDY TOUR TO KUNMING, YUNNAN

Sept. 19-20, 2001

Destinations:

1. Solar Energy Research Institute of Yunnan Normal University and Provincial Key Lab of Renewable Energy
2. Yunnan Semiconductor Factory
3. Eflame Yike Company
4. Kunming Xinying Solar Energy Device Factory

Attendants:

Jean Y. Ku (Project Leader, NREL), Jan Hamrin (Executive Director, Center for Resource Solutions), Tim Rosenfeld (Partner, HMW Int'l, Inc.), Lea Walker (President, Alltech Global Trading Co.), Li Xiaoping (Alltech), Simon Aw (Business Development Manager, Schott Singapore), Michelle Billig (Energy Attaché, American Embassy Beijing), Ruiqing Hu (CRED), Wei Lin (CREIA).

On the morning of September 19, the mission visited the Solar Energy Research Institute of Yunnan Normal University and the Provincial Key Lab of Renewable Energy in the company of Professor Liu Zuming. There they found three research rooms with respective orientations toward bioenergy, energy-saving technologies and environmental engineering, and solar energy utilization, in addition to a training center and pilot workshop. With an extensive exchange between international counterparts and cooperation in renewable energy projects, as well as training programs, the institute and lab are dedicated to accelerating the progress of renewable energy technologies and their commercialization. They began research and development of crystalline silicon solar cells in the 1970s, and from the early 1980s on, they transferred this technology to the Yunnan Semi-conductor Device Factory that the mission visited later in the morning.

The factory is an ISO9002-certified manufacturer with main products of silicon solar modules and their application product series; the factory's annual production capacity reaches 1.5 MW. After reforms based on imported American technology and equipment, the conversion efficiency of the product had been improved from 12% to 14.5%. In addition, with over 20 years' involvement in the production, distribution, installation, and after-sales service of solar cells, the factory had achieved a 30% market share. Their resolve in sticking to brand strategy was very impressive to mission members. Vice Director Mr. Dai Shunming gave the mission a tour and answered questions on working procedures and specific techniques.

In the afternoon, Mr. Yang Guanghui, Chairman of the Board of eFLAME, led the mission to several sites where their solar water heating systems were installed. Mission members even paid a visit to one of the household users and collected feedbacks from them. An example of a solar integrated building was also demonstrated, which drew a lot of interest from the visitors. Finally, a presentation from eFLAME was given which introduced the company's projects, objectives, and current status. The company expressed an intention of looking for international cooperation as well.

On September 20, a half-day study tour was conducted to the Kunming Solar Energy Device Factory. The factory has produced and installed solar water heaters over about 50 thousand square meters for more than ten new-style uptown residential properties, and has developed a strategy for integrating solar energy in buildings for many years. A sample of their latest product, a plane mold solar water heater system with low water pressure and high efficiency, was introduced and demonstrated. With corresponding functions of intensity, rigidity, waterproofing and heat isolation for installation and application, the system can be integrated into the solar roof and wall independently. The group showed great interest in the material and low cost of such a high-tech product.

STUDY TOUR TO INNER MONGOLIA AUTONOMOUS REGION September 21-23, 2001

Destinations:

1. Renewable Energy Experiment and Demonstration Center
2. Huade New Technology Company
3. Huiteng Xile Wind Farm

Attendants:

Robert Armstrong (First Secretary of Environmental Science, American Embassy in China); Jean Y. Ku (Project Leader, NREL), Lea Walker (President, Alltech Global Trading Co.), Li Xiaoping (Alltech), Simon Aw (Business Development Manager, Schott Singapore), Yanqin Song (CRED).

In the afternoon of September 21, the delegation visited the Renewable Energy Experiment and Demonstration Center affiliated with the Inner Mongolia Polytechnic University (IPU), which has more than 10 thousand students on campus. The Center demonstrates all the achievements and products of the region and serves as an ideal platform for exchange and cooperation with both domestic and international counterparts. Mr. Huo, Director of the Department of Energy and Power, Mr. Xing, Director of Science and Technology at IPU, and various staff showed the delegation around the demonstration site and gave a detailed presentation.

The center is mainly supported by the local Science Commission. The site featured installations of various sizes of wind turbines, a PV home system, a wind and PV hybrid system which supplied power for a yurt, and a passive solar building with a geothermal space heating system and solar water heater. A huge ball-shaped water tank, imported from the U.S., was installed at the solar building to test the solar water heater systems. In 1999, representatives from IPU had visited NREL for a short training program.

In the late afternoon, the delegation visited Huade New Technology Company, which was involved both in the Brightness Program and the GEF/World bank China Renewable Energy Development Project. Mr. Xiaojian Guo, General Manager of the company, presented the history of Huade, its experience in rural energy development, its development plan, and its interests in carrying out a strategy of international cooperation.

Huade is affiliated with the Inner Mongolia Livestock Machinery Research Institute, which has long been involved in research and development of wind and PV technology. Since its founding in 1993, Huade has manufactured and distributed some tens of thousands of small wind turbines, solar PV home systems, hybrid home systems, and village power systems. In the early 1990s, Huade began to implement a collaborative project sponsored by the governments of China and Germany. Through this collaboration, Huade received technical support from GTZ, GL, and some other German companies. The result was an advanced wind turbine testing farm; in addition, they carried out a resource assessment for solar and wind energy in Inner Mongolia, as well as an assessment of the electricity demand of different types of households in the province. Overall, Huade demonstrates ample and valuable experience in rural electrification.

Finally, the group visited a workshop manufacturing inverters for PV systems. The annual output of these inverters was 2000 in the year 2000, and it was estimated that this annual output would be consistent in 2001. Mr. Simon Aw expressed his interest in maintaining communication with Huade, with the possibility of carrying out some sort of collaborative project.

On the morning of Sept. 22, the delegation headed for the second-largest wind farm in China, Huitengxile. They were accompanied by Mr. Laisheng Qi, General Manager of the Inner Mongolia Wind Power Company, which is affiliated with the Inner Mongolia Utility Company. Huitengxile is one of four wind farms built and run by the Inner Mongolia Wind Company. The installed capacity of Huitengxile is 36 MW and consists of 61 wind turbines. Although it was very foggy and chilly, the delegation showed great interest in the wind farm; most of the wind turbines were going strong, rotating without fatigue under the gusty wind.